High Temperature Energy Storage for In Situ Planetary Atmospheric Measurement Technologies, Phase II

Completed Technology Project (2009 - 2011)

Project Introduction

Development of energy storage capable of operational temperatures of 380ºC and 486

o

C with a specific capacity 200 Wh/kg for use as a power source on the Venusian surface and for planetary probes in similar high temperature atmospheres and where ambient pressures of 90 atmospheres are to be expected. This proposal provides for further research and development of the Li(Al)/CoS2 high temperature energy storage chemistry to develop high temperature space energy storage, which will enable the in situ exploration of the atmosphere of Venus and deep atmospheres of Jupiter or Saturn for future NASA missions. This energy storage will provide power for thermal control systems, high temperature electronics and sensors, and high temperature motors and actuators. The approach has a parallel path of evaluation of low melting point electrolyte for 380ºC operation and optimization of the 486ºC Venus energy storage chemistry. The final task is battery level characterization at various temperatures and discharge rates, with implementation of the previously completed design of a robust battery/cell container and ceramic to metal seals. The development includes the delivery of a prototype battery to JPL for testing.

Anticipated Benefits

The R&D conducted under this program will have the potential to make improvements to thermal batteries, low temperature thermal batteries, high temperature energy storage for borehole and terrestrial applications, geothermal batteries and other specialty high temperature energy storage for space applications.

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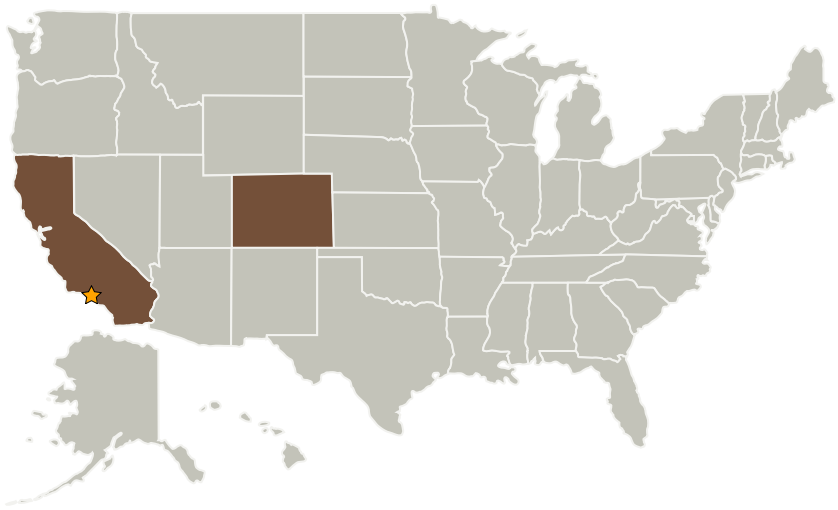
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Mobile Energy Products, Inc.	Supporting Organization	Industry	Colorado Springs, Colorado

Primary U.S. Work Locations	
California	Colorado

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Celestino B Rosca

Principal Investigator:

Za Johnson

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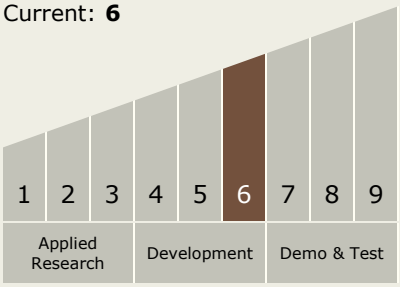
Technology Maturity (TRL)

Start: **6**
Current: **6**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries